UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/581,284	10/23/2006	Per Aberg	1304-7	3128

28249 7590 12/23/2009

DILWORTH & BARRESE, LLP
1000 WOODBURY ROAD
SUITE 405
WOODBURY, NY 11797

EXAMINER	
RALIS, STEPHEN J	

ART UNIT	PAPER NUMBER
3742	

MAIL DATE	DELIVERY MODE
12/23/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/581,284	ABERG, PER	
	Examiner	Art Unit	
	STEPHEN J. RALIS	3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,16,17,21,23,24 and 26-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,16,17,21,23,24 and 26-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 June 2006 and 26 August 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Applicant is respectfully requested to provide a location within the disclosure to support any further amendments to the claims due to when filing an amendment an applicant should show support in the original disclosure for new or amended claims. See MPEP § 714.02 and § 2163.06 ("Applicant should specifically point out the support for any amendments made to the disclosure.").

Response to Amendment/Arguments

3. Applicant's arguments with respect to claims 1-27 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 28 and 29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In the instant application, the examiner can find no disclosure to the "steps of cyclically alternating between short arc and the spray arc welding, and the short arc and

pulsing welding" as recited by applicant. The examiner can only find disclosure to "In the root run, pulsing is used between short arc and short pulsing and for the sealing run, pulsing is used between spray arc and short pulsing." (see page 6, lines 15-18). Clearly these are different. Therefore, the above recitation is deemed new matter.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-9, 16, 17, 21, 23, 24 and 26-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 1 recites the limitation "the short pulsing" in line 6; the limitation "the pulsing" in lines 7 and 9; Claim 2 recites the limitation "the pre-programmed pulsing" in line 3; Claim 3 recites the limitation "pulsing welding" in line 8; the limitation "said pulsing" in line 9; Claim 16 recites the limitation "pulsing welding" in line 8; the limitation "said pulsing" in line 9; the limitation "the short pulsing" in lines 13-14. There is insufficient antecedent basis for at least these limitations in the claims.

9. Claim 2 recites "The welding method as claimed in claim 1, comprising determining the duration or time for ***the by a frequency*** for cyclic alternating between the pre-programmed pulsing and spray arc welding." There seems to be a term missing the phrase highlighted directly above. It is unclear and indefinite

to what limitation the claim recites. Further clarification is required. (The claim was examine with the phrase "***the pulsing by a frequency***".

10. Claim 3 recites "controlling spray arc welding" in lines 3-4 and "controlling "short pulsing welding" in lines 5-6. It is unclear and indefinite to how many "short pulsing welding" and "spray arc welding" processes are occurring. Further clarification is required to either provide further differentiation form the preceding claims or provide proper antecedent basis for the limitations.

11. Claim 6 recites the limitation "for short arc or spray arc parameters". It is unclear and indefinite to what exactly the "short arc parameters" are since there is no recited "short arc" process. Further clarification is required.

12. In general, the claims are replete with such 35 U.S.C. 112, second paragraph issues. The above notes are exemplary with respect to all of the 35 U.S.C. 112, second paragraph rejections present in the instant case, ***all claims must be carefully reviewed and appropriate corrections should be made in response to this rejection***.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. Claims 1-9, 16, 17, 21, 23, 24 and 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu (International Publication No. WO 03/076114 A1) in view of Aberg et al. (U.S. Patent No. 6,388,233).

Hsu discloses a welding method for gas metal arc welding with continuous electrode feeding (page 1, lines 12-14; page 13, claim 1), comprising the steps of conducting spray arc welding (constant voltage spray process; page 2, lines 19-21), conducting short pulsing welding (pulsed GMAW welding process; page 2, lines 19-21), alternating cyclically between the short pulsing and the spray arc welding without intentionally extinguishing the arc in between the pulsing and spray arc welding, and pre-programming duration or time for at least one of the pulsing and spray arc welding prior to beginning (whole document).

With respect to the limitations of pre-programming a duration or time for at least one of the pulsing and spray arc welding prior to beginning, Hsu discloses setting the number of counts (CA, CB) for exact process (page 1, lines 17-23; page 9, line 1 – page 10, line 12; see Figure 1). Therefore, Hsu fully meets "pre-

programming a duration or time for at least one of the pulsing and spray arc welding prior to beginning" given its broadest reasonable interpretation.

With respect to the limitations of claim 2, Hsu disclose setting the number of counts each process occurs and then cyclically alternating to the next process. This setting of counts essentially is setting up the frequency at which the cyclic cycling occurs (page 1, lines 17-23; page 9, line 1 – page 10, line 12; see Figure 1). Therefore, Hsu fully meets "determining the duration or time for the pulsing by a frequency for cyclic alternating between the pre-programmed pulsing and spray arc welding" given its broadest reasonable interpretation.

With respect to the limitations of claims 3 and 16, Hsu discloses a first process regulator to control a first process welding and a second process regulator for controlling a second process welding with both process regulators having setting means and facilitation to control the phases between the respective welding processes is known in the art. Hsu, for example, teaches a first process regulator (200; Process A control system) and a second process regulator (202; Process A control system) (page 2, lines 19-21; page 8, line 8 – page 9, line 6) that are controlled by setting CA and CB to control the desired wave shape for a particular welding process. Therefore, Hsu fully meets "a first process regulator for initiating and controlling spray arc welding, a second process regulator for initiating and controlling short pulsing welding.

With respect to the limitations of claims 6-9, 17 and 21, Hsu discloses setting devices (214, 216) that set that would have internally developed support (process control 224/timer226) for facilitating the selection of the waveform

(180/220) as is evidenced by the logic information data line (210) that is provided to the selection of the waveform (180/220). Therefore, Hsu et al. fully meets "wherein the pre-programming means also comprises a setting device with special support for facilitating programming of a first phase with setting data for spray arc parameters, and a second phase with setting data for the short pulsing", "comprising a setting device with special support for facilitating programming of a first phase with setting data for spray arc parameters, and a second phase with setting data for the short pulsing", "a setting device with special support for facilitating programming of a first phase with setting data for spray arc parameters, and a second phase with setting data for the short pulsing" and "a setting device with special support for facilitating programming of the cyclic alternating between the first and second phases" (and variations thereof) given its broadest reasonable interpretation.

Hsu discloses all of the limitations of the claimed invention, as previously set forth, however, is silent to the short pulse welding separating off essentially one droplet per pulse; the welding device having a power source; the pre-programming means comprising a timer settable for durations or times of 25 to 1000 ms or 50 to 300 ms; preventing occurrence of a short circuit during both the short arc welding and short pulsing; pulsing is conducted by periodically increasing welding current to a pulse current of size and length so that current density in a welding electrode creates sufficient electromagnetic force to separate off one droplet per pulse; the welding current forms a bell curve above background current for each pulse, with the droplet separating at a peak current

value for each pulse; and additionally comprising the steps of/means for cyclically alternating between short arc and the spray arc welding, and the short arc and pulsing welding.

However, synergic pulsing and control thereof is known in the art. Aberg et al., for example, teach that it is conventional for a short arc welding process to involve short circuit welding in which the heat transfer to the material is moderate (column 1, lines 30-50). In addition, Aberg et al. teach a pulse welding process called synergic pulsing in which each pulse separates a drop in order to provide advantages from spraying range in the form of low welding splash without the disadvantages of the great heat transfer. Similarly, a power source (1) being connected between an electrode (7) and a workpiece (8) is a conventional manner in welding to create a potential difference between the electrode (7) and the workpiece (8). In addition, Aberg et al. teach: pulsing is conducted by periodically increasing welding current to a pulse current of size and length so that current density in a welding electrode creates sufficient electromagnetic force to separate off one droplet per pulse (Abstract; column 2, lines 39-55); preventing occurrence of a short circuit during short pulsing (claim 1); the welding current forms a bell curve above background current for each pulse, with the droplet separating at a peak current value for each pulse (column 3, lines 43-57; see Figure 4); and the regulation of such a device can occur in either software or hardware (column 4, lines 57-59). Aberg et al. further teaches the advantage of such a configuration provides a virtually splash-free welding and reduced

sensitivity for parameter-setting accuracy, thereby increasing the operational versatility of the welding apparatus (column 3, lines 4-9).

Similarly, Hsu teaches, that in welders, the wave shape of the current is controlled accurately to perform diverse welding processes as pulse welding, constant voltage welding, spray welding, pulse welding, short-arc CV welding and STT welding (page 1, lines 17-23). However, Hsu teaches that there is a need to automate such processes.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Hsu with the synergic pulsing and control thereof of Aberg et al. in order to provide a virtually splash-free welding and reduced sensitivity for parameter-setting accuracy, thereby increasing the operational versatility of the welding apparatus. In addition, to provide durations or times of 25 to 1000 ms or 50 to 300 ms would have been a mere engineering expediency as Hsu clearly teaches the variation of the frequency utilizing waveform generation depending on the desired output. Similarly, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide durations or times of 25 to 1000 ms or 50 to 300 ms, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. Furthermore, the manner of enhancing pulse welding (without short-circuiting) was made part of the ordinary capabilities of one skilled in the art based upon the teaching of such improvement in Aberg et al. Accordingly, one of ordinary skill in the art would have been capable of applying this known

"improvement" technique in the same manner to the prior art short pulse arc welding of Hsu and the results would have been predictable to one of ordinary skill in the art, namely, one skilled in the art would have readily recognized that preventing short-circuiting during welding provides a virtually splash-free welding and reduced sensitivity for parameter-setting accuracy, thereby increasing the operational versatility of the welding apparatus.

Similarly, to provide additional alternating between alternating between short arc and the spray arc welding, and the short arc and pulsing welding would have been a mere engineering expediency as Hsu clearly teaches welders having the wave shape of the current being controlled accurately to perform diverse welding processes as pulse welding, constant voltage welding, spray welding, pulse welding, short-arc CV welding and STT welding and the need to automatically switch between various processes.

16. Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu (International Publication No. WO 03/076114 A1) in view of Aberg et al. (U.S. Patent No. 6,388,233) as applied to claims 1-9, 16, 17, 21, 23, 24 and 26-29 above, and further in view of Takeuchi et al. (U.S. Patent No. 4,621,183).

Hsu in view of Aberg et al. discloses all of the limitations of the claimed invention, as previously set forth, except for the step of/means for welding vertical V-joints in aluminum or stainless steel material 5-10 mm thick without weaving.

However, welding vertical V-joints in aluminum or stainless steel material 5-10 mm thick is known in the art. Inoue et al., for example, teach a root pass welding of V-joints in stainless steel plates with the plates being approximately 5-10 mm thick.

Similarly, to perform welding without weaving is known in the art. Takeuchi et al., for example, teach conducting welding without weaving in order to provide a good form of weld bead (column 7, lines 5-7).

The examiner asserts that applying a known technique to a known device ready for improvement would yield predictable results. That is, it would have been recognized by one of ordinary skill in the art that applying the known technique taught by Inoue et al. to the welding method and welding power source of Hsu in view of Aberg et al. would have yielded predicable results and resulted in an improved system, namely, providing welding vertical of V-joints in stainless steel material 5-10 mm thick in Hsu in view of Aberg et al. to provide a corrosive resistance weld against a corrosive environment and improve welding-proof hot-tear property and mechanical characteristics.

In addition, the examiner asserts use of known technique to improve similar devices in the same way is obvious to one of ordinary skill in the art. That is, the manner of enhancing a particular device (providing welding vertical of V-joints in stainless steel material 5-10 mm thick) was made part of the ordinary capabilities of one skilled in the art based upon the teaching of such improvement in Inoue et al. Accordingly, one of ordinary skill in the art would have been capable of applying this known "improvement" technique in the same

manner to the prior art welding method and welding power source of Hsu in view of Aberg et al. and the results would have been predictable to one of ordinary skill in the art, namely, one skilled in the art would have readily recognized that providing welding vertical of V-joints in stainless steel material 5-10 mm thick in Hsu in view of Aberg et al. would positively provide a corrosive resistance weld against a corrosive environment and improve welding-proof hot-tear property and mechanical characteristics.

Similarly, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Hsu in view of Aberg et al. with the welding occurring without weaving of Takeuchi et al. in order to provide a good form of weld bead.

The examiner also asserts that applying a known technique to a known device ready for improvement would yield predictable results. That is, it would have been recognized by one of ordinary skill in the art that applying the known technique taught by Takeuchi et al. to the welding method and welding power source of Hsu in view of Aberg et al. would have yielded predicable results and resulted in an improved system, namely, providing a welding without weaving in Hsu in view of Aberg et al. to provide a good form of weld bead.

Similarly, the examiner asserts use of known technique to improve similar devices in the same way is obvious to one of ordinary skill in the art. That is, the manner of enhancing a particular device (providing a welding without weaving) was made part of the ordinary capabilities of one skilled in the art based upon the teaching of such improvement in Takeuchi et al. Accordingly, one of ordinary

skill in the art would have been capable of applying this known "improvement" technique in the same manner to the prior art welding method and welding power source of Hsu in view of Aberg et al. and the results would have been predictable to one of ordinary skill in the art, namely, one skilled in the art would have readily recognized that providing a welding without weaving in Hsu in view of Aberg et al. would positively provide a good form of weld bead.

Furthermore, the examiner asserts that choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success (i.e. "Obvious to try"). That is Takeuchi et al. explicitly teach providing a welding without weaving. Therefore with the teaching of Takeuchi et al. utilizing welding without weaving, Takeuchi et al. teach that one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success (i.e. Obvious to try).

17. Claims 1-9, 16, 17, 21, 23, 24, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morlock (U.S. Patent No. 5,773,779) in view of Aberg et al. (U.S. Patent No. 6,388,233).

Morlock discloses a welding method for gas metal arc welding with continuous electrode feeding (gas shielded arc welding steel; Abstract; column 4, line 39 – column 5, line 36; column 9, line 59 – column 11, line 3; see Figures 8, 11, 11A, 12 , 13), comprising the steps of conducting spray arc welding (see Figure 13), conducting short pulsing welding (see Figure 13), alternating cyclically between the short pulsing and the spray arc welding without

intentionally extinguishing the arc in between the pulsing and spray arc welding, and pre-programming duration or time for at least one of the pulsing and spray arc welding prior to beginning column 4, line 39 – column 5, line 36; column 9, line 59 – column 11, line 3; see Figures 8, 11, 11A, 12 , 13).

With respect to the limitations of pre-programming a duration or time for at least one of the pulsing and spray arc welding prior to beginning, Morlock explicitly disclose a process that occurs as set forth in Figure 13 that alternates cyclically between short pulsing and the spray arc welding in relation to a series of structural dissemination. In addition, Morlock discloses a high performance digitally controlled power supply with complex, high speed waveform control (column 4, line 39 – column 5, line 36; column 10, line 35 – column 11, line 3) that controls the immediate switching between constant voltage spray welding and then an appropriately control pulsed welding process. Clearly this controller would be pre-programmed with the duration or time of each welding process event in order to control the cyclically between short pulsing and the spray welding as disclosed in Figure 13 or the welding process would not perform as disclosed. Therefore, Morlock fully meets "pre-programming a duration or time for at least one of the pulsing and spray arc welding prior to beginning" given its broadest reasonable interpretation.

With respect to the limitations of claim 2, Morlock discloses a high performance digitally controlled power supply with complex, high speed waveform control (column 4, line 39 – column 5, line 36; column 10, line 35 – column 11, line 3) that controls the immediate switching between constant

voltage spray welding and then an appropriately control pulsed welding process. Again, Morlock discloses a high performance digitally controlled power supply with complex, high speed waveform control (column 4, line 39 – column 5, line 36; column 10, line 35 – column 11, line 3) that controls the immediate switching between constant voltage spray welding and then an appropriately control pulsed welding process. Clearly this controller would determine the frequency for cyclically alternating between short pulsing and the spray welding as disclosed in Figure 13 or the welding process would not perform as disclosed. Therefore, Morlock fully meets "determining the duration or time for the pulsing by a frequency for cyclic alternating between the pre-programmed pulsing and spray arc welding" given its broadest reasonable interpretation.

With respect to the limitations of claim 3, Morlock discloses a welding power source for MIG/MAG welding (Lincoln Electric Powerwave 450 power supply) comprising a high performance digitally controlled power supply with complex, high speed waveform control (column 4, line 39 – column 5, line 36; column 10, line 35 – column 11, line 3) that controls the immediate switching between constant voltage spray welding and then an appropriately control pulsed welding process. Morlock discloses the controller controlling a "spray welding process" and a "pulsed weld process" with each process including its own designated "high speed waveform control" (i.e. regulator/control) or, again, the welding process would not perform as disclosed. Therefore, Morlock fully meets "a first process regulator for initiating and controlling spray arc welding, a second process regulator for initiating and controlling short pulsing welding .

With respect to the limitations of claims 6-9 and 21, Morlock discloses a high performance digitally controlled power supply with complex, high speed waveform control (column 4, line 39 – column 5, line 36; column 10, line 35 – column 11, line 3) that controls the immediate switching between constant voltage spray welding and then an appropriately control pulsed welding process. Such a control would include a setting device with special programming to set up the welding process that is automated, as disclosed in Figure 13, which would include designated "high speed waveform control" and the ability to set phase parameters with respect to the generated wave forms to automatically and immediately cyclically alternate between short pulsing and the spray welding. Therefore, Morlock et al. fully meets "wherein the pre-programming means also comprises a setting device with special support for facilitating programming of a first phase with setting data for spray arc parameters, and a second phase with setting data for the short pulsing", "comprising a setting device with special support for facilitating programming of a first phase with setting data for spray arc parameters, and a second phase with setting data for the short pulsing", "a setting device with special support for facilitating programming of a first phase with setting data for spray arc parameters, and a second phase with setting data for the short pulsing" and "a setting device with special support for facilitating programming of the cyclic alternating between the first and second phases" (and variations thereof) given its broadest reasonable interpretation.

With respect to the limitations of claims 16 and 17, Morlock discloses a high performance digitally controlled power supply with complex, high speed

waveform control (column 4, line 39 – column 5, line 36; column 10, line 35 – column 11, line 3) that controls the immediate switching between constant voltage spray welding and then an appropriately control pulsed welding process. Such a control would include a setting device with special programming to set up the welding process that is automated, as disclosed in Figure 13, which would include designated "high speed waveform control" and the ability to set phase parameters with respect to the generated wave forms to automatically and immediately cyclically alternate between short pulsing and the spray welding. Therefore, Morlock fully meets "the pre-programming means also comprises a setting device with special support for facilitating programming of a first phase with setting data for spray arc parameters, and a second phase with setting data for the short pulsing" given its broadest reasonable interpretation.

Morlock discloses all of the limitations of the claimed invention, as previously set forth, however, is silent to the short pulse welding separating off essentially one droplet per pulse; the welding device having a power source; the pre-programming means comprising a timer settable for durations or times of 25 to 1000 ms or 50 to 300 ms; preventing occurrence of a short circuit during both the short arc welding and short pulsing; pulsing is conducted by periodically increasing welding current to a pulse current of size and length so that current density in a welding electrode creates sufficient electromagnetic force to separate off one droplet per pulse; the welding current forms a bell curve above background current for each pulse, with the droplet separating at a peak current value for each pulse.

However, synergic pulsing and control thereof is known in the art. Aberg et al., for example, teach that it is conventional for a short arc welding process to involve short circuit welding in which the heat transfer to the material is moderate (column 1, lines 30-50). In addition, Aberg et al. teach a pulse welding process called synergic pulsing in which each pulse separates a drop in order to provide advantages from spraying range in the form of low welding splash without the disadvantages of the great heat transfer. Similarly, a power source (1) being connected between a an electrode (7) and a workpiece (8) is a conventional manner in welding to create a potential difference between the electrode (7) and the workpiece (8). In addition, Aberg et al. teach: pulsing is conducted by periodically increasing welding current to a pulse current of size and length so that current density in a welding electrode creates sufficient electromagnetic force to separate off one droplet per pulse (Abstract; column 2, lines 39-55); preventing occurrence of a short circuit during short pulsing (claim 1); the welding current forms a bell curve above background current for each pulse, with the droplet separating at a peak current value for each pulse (column 3, lines 43-57; see Figure 4); and the regulation of such a device can occur in either software or hardware (column 4, lines 57-59). Aberg et al. further teaches the advantage of such a configuration provides a virtually splash-free welding and reduced sensitivity for parameter-setting accuracy, thereby increasing the operational versatility of the welding apparatus (column 3, lines 4-9).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Morlock with the synergic pulsing and control

thereof of Aberg et al. in order to provide a virtually splash-free welding and reduced sensitivity for parameter-setting accuracy, thereby increasing the operational versatility of the welding apparatus. In addition, to provide durations or times of 25 to 1000 ms or 50 to 300 ms would have been a mere engineering expediency as Morlock clearly teaches the variation of the frequency utilizing waveform generation depending on the desired output. Similarly, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to provide durations or times of 25 to 1000 ms or 50 to 300 ms, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. Furthermore, the manner of enhancing pulse welding (without short-circuiting) was made part of the ordinary capabilities of one skilled in the art based upon the teaching of such improvement in Aberg et al. Accordingly, one of ordinary skill in the art would have been capable of applying this known "improvement" technique in the same manner to the prior art short pulse arc welding of Morlock and the results would have been predictable to one of ordinary skill in the art, namely, one skilled in the art would have readily recognized that preventing short-circuiting during welding provides a virtually splash-free welding and reduced sensitivity for parameter-setting accuracy, thereby increasing the operational versatility of the welding apparatus.

18. Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morlock (U.S. Patent No. 5,773,779) in view of Aberg et al.

(U.S. Patent No. 6,388,233) as applied to claims 1-9, 16, 17, 21, 23, 24, 26 and 27 above, and further in view of Takeuchi et al. (U.S. Patent No. 4,621,183).

Morlock in view of Aberg et al. discloses all of the limitations of the claimed invention, as previously set forth, except for the step of/means for welding vertical V-joints in aluminum or stainless steel material 5-10 mm thick without weaving.

However, welding vertical V-joints in aluminum or stainless steel material 5-10 mm thick is known in the art. Inoue et al., for example, teach a root pass welding of V-joints in stainless steel plates with the plates being approximately 5-10 mm thick.

Similarly, to perform welding without weaving is known in the art. Takeuchi et al., for example, teach conducting welding without weaving in order to provide a good form of weld bead (column 7, lines 5-7).

The examiner asserts that applying a known technique to a known device ready for improvement would yield predictable results. That is, it would have been recognized by one of ordinary skill in the art that applying the known technique taught by Inoue et al. to the welding method and welding power source of Morlock in view of Aberg et al. would have yielded predicable results and resulted in an improved system, namely, providing welding vertical of V-joints in stainless steel material 5-10 mm thick in Morlock in view of Aberg et al. to provide a corrosive resistance weld against a corrosive environment and improve welding-proof hot-tear property and mechanical characteristics.

In addition, the examiner asserts use of known technique to improve similar devices in the same way is obvious to one of ordinary skill in the art. That is, the manner of enhancing a particular device (providing welding vertical of V-joints in stainless steel material 5-10 mm thick) was made part of the ordinary capabilities of one skilled in the art based upon the teaching of such improvement in Inoue et al. Accordingly, one of ordinary skill in the art would have been capable of applying this known "improvement" technique in the same manner to the prior art welding method and welding power source of Morlock in view of Aberg et al. and the results would have been predictable to one of ordinary skill in the art, namely, one skilled in the art would have readily recognized that providing welding vertical of V-joints in stainless steel material 5-10 mm thick in Morlock in view of Aberg et al. would positively provide a corrosive resistance weld against a corrosive environment and improve welding-proof hot-tear property and mechanical characteristics.

Similarly, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Morlock in view of Aberg et al. with the welding occurring without weaving of Takeuchi et al. in order to provide a good form of weld bead.

The examiner also asserts that applying a known technique to a known device ready for improvement would yield predictable results. That is, it would have been recognized by one of ordinary skill in the art that applying the known technique taught by Takeuchi et al. to the welding method and welding power source of Morlock in view of Aberg et al. would have yielded predicable results

and resulted in an improved system, namely, providing a welding without weaving in Morlock in view of Aberg et al. to provide a good form of weld bead.

Similarly, the examiner asserts use of known technique to improve similar devices in the same way is obvious to one of ordinary skill in the art. That is, the manner of enhancing a particular device (providing a welding without weaving) was made part of the ordinary capabilities of one skilled in the art based upon the teaching of such improvement in Takeuchi et al. Accordingly, one of ordinary skill in the art would have been capable of applying this known "improvement" technique in the same manner to the prior art welding method and welding power source of Morlock in view of Aberg et al. and the results would have been predictable to one of ordinary skill in the art, namely, one skilled in the art would have readily recognized that providing a welding without weaving in Morlock in view of Aberg et al. would positively provide a good form of weld bead.

Furthermore, the examiner asserts that choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success (i.e. "Obvious to try"). That is Takeuchi et al. explicitly teach providing a welding without weaving. Therefore with the teaching of Takeuchi et al. utilizing welding without weaving, Takeuchi et al. teach that one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success (i.e. Obvious to try).

19. To the degree it can be argued that Morlock in view of Aberg et al. does not disclose a first process regulator to control the spray arc welding and a

second process regulator for controlling short pulse welding with both process regulators having setting means and facilitation to control the phases between the respective spray arc welding and short pulse welding processes, the additional rejection is provided as set forth below:

20. Claims 3-9, 16, 17, 21 and 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morlock (U.S. Patent No. 5,773,779) in view of Aberg et al. (U.S. Patent No. 6,388,233) as applied to claims 1-9, 16, 17, 21, 23, 24, 26 and 27 above, and further in view of Hsu (International Publication No. WO 03/076114 A1).

Morlock in view of Aberg et al. discloses all of the limitations of the claimed invention, as previously set forth, except for specifically calling for a first process regulator to control the spray arc welding and a second process regulator for controlling short pulse welding with both process regulators having setting means and facilitation to control the phases between the respective spray arc welding and short pulse welding processes; and additionally comprising the steps of/means for cyclically alternating between short arc and the spray arc welding, and the short arc and pulsing welding.

However, a first process regulator to control a first process welding and a second process regulator for controlling a second process welding with both process regulators having setting means and facilitation to control the phases between the respective welding processes is known in the art. Hsu, for example, teaches a first process regulator (200; Process A control system) and a second

process regulator (202; Process A control system) (page 2, lines 19-21; page 8, line 8, page 9, line 6) that are controlled by setting CA and CB to control the desired wave shape for a particular welding process. Hsu further teaches such a configuration provides a means to cause a wave shaper to implement a designated process by way of a signal command to the power supply, thereby simplifying the operational efficiency of the device.

With respect to the limitations of claims 28 and 29, Hsu teaches, that in welders, the wave shape of the current is controlled accurately to perform diverse welding processes as pulse welding, constant voltage welding, spray welding, pulse welding, short-arc CV welding and STT welding (page 1, lines 17-23). However, Hsu teaches that there is a need to automate such processes.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the silent regulation of the spray arc welding and the short pulse arc welding processes of Morlock in view of Aberg et al. with the first process regulator to control the first process welding and the second process regulator for controlling the second process welding with both process regulators having setting means and facilitation to control the phases between the respective welding processes of Hsu in order to provide a means to cause a wave shaper to implement a designated process by way of a signal command to the power supply, thereby simplifying the operational efficiency of the device. To provide additional alternating between alternating between short arc and the spray arc welding, and the short arc and pulsing welding would have been a mere engineering expediency as Hsu clearly teaches welders having the wave

shape of the current being controlled accurately to perform diverse welding processes as pulse welding, constant voltage welding, spray welding, pulse welding, short-arc CV welding and STT welding and the need to automatically switch between various processes.

21. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morlock (U.S. Patent No. 5,773,779) in view of Hsu U.S. Patent No. WO 03/076114 A1) as applied to claims 3-9, 16, 17, 21 and 26-29above, and further in view of Takeuchi et al. (U.S. Patent No. 4,621,183).

Morlock in view of Aberg et al. and Hsu discloses all of the limitations of the claimed invention, as previously set forth, except for the step of/means for welding vertical V-joints in aluminum or stainless steel material 5-10 mm thick without weaving.

However, welding vertical V-joints in aluminum or stainless steel material 5-10 mm thick is known in the art. Inoue et al., for example, teach a root pass welding of V-joints in stainless steel plates with the plates being approximately 5-10 mm thick.

Similarly, to perform welding without weaving is known in the art. Takeuchi et al., for example, teach conducting welding without weaving in order to provide a good form of weld bead (column 7, lines 5-7).

The examiner asserts that applying a known technique to a known device ready for improvement would yield predictable results. That is, it would have been recognized by one of ordinary skill in the art that applying the known

technique taught by Inoue et al. to the welding method and welding power source of Morlock in view of Aberg et al. and Hsu would have yielded predicable results and resulted in an improved system, namely, providing welding vertical of V-joints in stainless steel material 5-10 mm thick in Morlock in view of Aberg et al. and Hsu to provide a corrosive resistance weld against a corrosive environment and improve welding-proof hot-tear property and mechanical characteristics.

In addition, the examiner asserts use of known technique to improve similar devices in the same way is obvious to one of ordinary skill in the art. That is, the manner of enhancing a particular device (providing welding vertical of V-joints in stainless steel material 5-10 mm thick) was made part of the ordinary capabilities of one skilled in the art based upon the teaching of such improvement in Inoue et al. Accordingly, one of ordinary skill in the art would have been capable of applying this known "improvement" technique in the same manner to the prior art welding method and welding power source of Morlock in view of Aberg et al. and Hsu and the results would have been predictable to one of ordinary skill in the art, namely, one skilled in the art would have readily recognized that providing welding vertical of V-joints in stainless steel material 5-10 mm thick in Morlock in view of Aberg et al. and Hsu would positively provide a corrosive resistance weld against a corrosive environment and improve welding-proof hot-tear property and mechanical characteristics.

Similarly, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Morlock in view of Aberg et al. al.

and Hsu with the welding occurring without weaving of Takeuchi et al. in order to provide a good form of weld bead.

The examiner also asserts that applying a known technique to a known device ready for improvement would yield predictable results. That is, it would have been recognized by one of ordinary skill in the art that applying the known technique taught by Takeuchi et al. to the welding method and welding power source of Morlock in view of Aberg et al. and Hsu would have yielded predicable results and resulted in an improved system, namely, providing a welding without weaving in Morlock in view of Aberg et al. and Hsu to provide a good form of weld bead.

Similarly, the examiner asserts use of known technique to improve similar devices in the same way is obvious to one of ordinary skill in the art. That is, the manner of enhancing a particular device (providing a welding without weaving) was made part of the ordinary capabilities of one skilled in the art based upon the teaching of such improvement in Takeuchi et al. Accordingly, one of ordinary skill in the art would have been capable of applying this known "improvement" technique in the same manner to the prior art welding method and welding power source of Morlock in view of Aberg et al. and Hsu and the results would have been predictable to one of ordinary skill in the art, namely, one skilled in the art would have readily recognized that providing a welding without weaving in Morlock in view of Aberg et al. and Hsu would positively provide a good form of weld bead.

Furthermore, the examiner asserts that choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success (i.e. "Obvious to try"). That is Takeuchi et al. explicitly teach providing a welding without weaving. Therefore with the teaching of Takeuchi et al. utilizing welding without weaving, Takeuchi et al. teach that one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success (i.e. Obvious to try).

Conclusion

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHEN J. RALIS whose telephone number is (571)272-6227. The examiner can normally be reached on Monday - Friday, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu Hoang can be reached on 571-272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Stephen J Ralis/
Primary Examiner, Art Unit 3742

Stephen J Ralis
Primary Examiner
Art Unit 3742

SJR
December 17, 2009